

Best Wishes to Mike

Frank E. Paige, BNL

Mike and I have been colleagues at BNL for 40+ years.

We have not been frequent collaborators or worked on similar things. But we have interacted often and enjoyably.

So this will not be a technical talk, just a few brief personal comments in appreciation.

I have only a vague recollection of when Mike began talking about lattice gauge theory.

He decided to try it out numerically.

Mike was not a big computer user then, but we had in the group an HP9830 with a few thousand words of memory. It had an x-y plotter and was programmable in BASIC.

Mike had been playing with it and used it for his first Z_2 lattice gauge theory simulation. It is long gone, but I found pictures on hpmuseum.org. . . .



MoHPC



Mike quickly moved on to the Lab's CDC 6600/7600. The 7600 was state of the art at the time with 64k+512k words of memory and a speed of about 10 MFLOP.

This gave the first real lattice results:

Experiments with a Gauge-Invariant Ising System

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Using Monte Carlo techniques, we evaluate the path integral for the four-dimensional lattice gauge theory with a Z_2 gauge group. The system exhibits a first-order transition. This is contrary to the implications of the approximate Migdal recursion relations but consistent with mean-field-theory arguments. Our "data" agree well with a low-temperature expansion and the exact duality between the high- and low-temperature phases.

One more old computer picture:



Some 35 years later, lattice gauge theory is a major activity at BNL and elsewhere – with $\mathcal{O}(10^8)$ more computing power, a factor of about 1.7/year. Remains main approach to non-perturbative QCD.

Mike's early lattice work reflects both his deep understanding and an almost playful eagerness to try new things.

He has always focused on understanding the physics.

The first acknowledgment in the PRL was to Vic Emery. We lost something important when Condensed Matter was separated.

But RBRC has been a huge asset for lattice theory and otherwise.

Mike, thanks for your contributions to our group, and best wishes for the future.